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Relative Leasing Advantage: A Blended Methods Approach

By Rui de Sousa Camposinhos* and José Lello**

Abstract

This paper presents a streamlined framework to assess the relative advantage of leasing versus owning in real estate ("Buy vs. Rent"). The model prioritizes transparency and ease of use for practitioners operating under heterogeneous, data-constrained local markets. Combining cost-based and income-based valuation, we derive closed-form decision rules for investors/landlords and tenants. The framework avoids heavy stochastic machinery by design, trading granularity for portability across contexts. We document how key inputs (yields, operating costs, taxes, maintenance) shift thresholds for the leasing/ownership choice and provide worked examples to illustrate practical use. We also delineate scope and limitations, and outline how policy changes (e.g., rent control) would map into the model's primitives. The result is a replicable tool for decision-making where simplicity and interpretability are paramount.

Keywords: Buy vs. rent, leasing, real estate valuation, cost approach, income approach

1. Introduction

In real estate, the term "Leasing Advantage" refers to the benefits or advantages associated with leasing a property instead of purchasing it.

Real estate decisions, such as whether to lease, buy, or sell a property, are critical considerations for tenants, landlords, and real estate developers. These decisions are often influenced by various factors, including financial considerations, market conditions, and individual preferences. Understanding the relative advantages of leasing compared to buying or selling is essential in making informed decisions in the real estate market. By considering key valuation approaches and employing a mixed methods approach, we provide valuable insights into the dynamics and trade-offs associated with leasing versus other options in the real estate sector.

* Rui de Sousa Camposinhos, School of Engineering, Polytechnic of Porto, e-mail: rdc@isep.ipp.pt

** José Lello, School of Engineering, Polytechnic of Porto, e-mail: jca@isep.ipp.pt

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The traditional literature on housing tenure analyzes the rent-versus-own margin along several axes. Supply constraints shape both rents and capital gains (Glaeser and Gyourko, 2018). Taxation can distort tenure choice and tilt returns toward ownership (Poterba, 1992). Classic econometric work documents how inflation and interest-rate regimes shift the own-rent decision (Hendershott and Shilling, 1982), while subsequent models separate consumption from investment motives (Brueckner, 1997) and link space and asset markets (DiPasquale & Wheaton, 1992). More recently, Buy-vs-Rent indices have been used as forward-looking barometers (Johnson et. al., 2020). Our contribution differs by offering a closed-form, practitioner-oriented tool that avoids explicit stochastic dynamics or utility specification and can be calibrated with minimal local data, yielding transparent decision rules and sensitivity checks.

1.1 Valuation Approaches

The valuation of urban buildings is commonly conducted using three distinct approaches.

The *cost-based approach* primarily involves adding the value of the land to the cost of replacing the building that performs the same functions as the evaluated property. This approach is referred to as the Cost Method, and the resulting value is known as the Value Based on Cost (*VBC*). This value can be estimated using the static cost method, which defines or estimates a profit margin value, or through the dynamic cost method, which considers the replacement cost of the building.

The *income-based approach* assigns value based on a given or determined income, known as the Value Based on Income (*VBR*). This approach generally involves two main sets of methods: Capitalization Methods and Discounted Cash Flow Methods. These methods consider the determination and conceptualization of yields, capitalization rates, and capital opportunity costs.

The *market analysis approach* relies on methodologies supported by market values and employs comparative techniques. This approach is commonly known as the Comparative Method, Market Method, or Comparative Market Method. In this framework, the value of the property is assessed as the Presumed Transaction Value (*PVT*).

It is important to note that these three approaches provide different perspectives on property valuation, and their application depends on factors such as the purpose of the valuation, the availability of data, and specific market conditions. The integration of these approaches can offer a more comprehensive and accurate assessment of the value of urban buildings.

This paper does not discuss evaluating real estate items using market methods, which involve comparative studies. Instead, it focuses on determining the rela-

tive advantage between buying (or selling) and renting. For that reason, we provide a brief description of the cost-based and income-based approaches to help the reader understand the meaning and identify the variables used in this study.

Table 1

Notation

V_{BC}	Cost-based value
V_{BR}	Income-based value
VRA	Relative leasing advantage, VBR/VBC
R_i	Gross annual rent (income)
TIR	Income tax rate applied to R_i
TIM	Property/municipal tax rate applied to value
T_M	Maintenance cost rate applied to construction cost C
t_a	Annual discount/conversion factor (yield)
τ_C	Relative construction cost C/VBC

Note: Table 1 summarises the notation used throughout the paper. Financial rates are annual unless noted.

This manuscript proceeds as follows. Section 3 presents the cost-based approach. Section 4 sets out the income-based approach. Section 5 introduces the blended framework and decision rules, with illustrative examples in Section 5.1.2. Section 5.2 develops the buyer or tenant perspective. Section 2 states scope and limitations. Section 6 concludes.

2. Scope and Limitations

As with any analytical framework, ours has boundaries that deserve to be made explicit. The framework is intentionally parsimonious: it is conceived as a portable, practitioner-oriented tool rather than as a substitute for utility-based or fully stochastic models. We do not model labor income risk, stochastic interest rates, or house-price processes, nor do we embed investor utility. These exclusions are deliberate, as they preserve transparency, data frugality, and ease of replication across local markets where detailed micro-data and long time series are often unavailable.

The immediate implication is that our policy takeaways are *conditional* on deterministic inputs chosen by the user. When risk is first-order, richer setups – such as portfolio choice models with stochastic state variables – are appropriate avenues for future work. In that sense, our contribution should be read as a tractable benchmark: it offers decision rules that are simple, interpretable, and adaptable, while leaving open the possibility of extension towards more elaborate stochastic or utility-based frameworks.

Policy Environment (e.g., Rent Control)

Policy shifts map naturally into our primitives. A rent cap affects the income approach by bounding R_a (and hence $V_{BR} = R_a/t_a$) and by altering expected growth of rents; it can also change operating costs and vacancy. Transaction taxes or property taxes adjust *TIM* and cash-flow timing. In our decision rules, these enter via (R_i, *TIR, TIM,* T_M, t_a), shifting the thresholds for *VRA* or the break-even rent/sale values, Equations (23) – (25). While we do not simulate specific reforms, users can perform scenario analysis by perturbing these inputs.

3. Cost-Based Approach

Among the various real estate appraisal methods, the cost method holds significant importance. It involves calculating the expenses associated with the entire real estate investment process, such as land acquisition, project development, construction, marketing, and indirect costs. By adding a profit margin to these costs, the static method derives the property's valuation, often represented as *VBC* (Value Based on Cost), providing a foundational estimate of the property's value[1].

The general formulation for estimating the value based on cost, *VBC*, is written in implicit form:

$$\begin{aligned} VBC - C_{inv} - L = 0 \\ C_{inv} = T + D_{proj} + C + K + M. \end{aligned} \tag{1}$$

where:

C_{inv}: Represents the cost of investment required for the formation of the asset.

L: Represents the return of the developer, often expressed as a profit margin.

T: Corresponds to the cost or value of the land, acquisition expenses and fees related to studies and infrastructure projects resulting from the type of occupancy. It also must include the cost of installed or to-be-installed infrastructure works.

D_{proj}: Costs related to the design project and technical assistance from designers.

C: Costs associated with the necessary operations for the construction or rehabilitation of a property. Its value is estimated based on the project phase, using appropriate methodologies.

[1] The cost method has evolved over the years, and more refined approach is available, such as a pseudo-dynamic method where time value of money is considered, distributing the different costs over the project timeline according their occurrence (Camposinhos and Oliveira, 2019).

K: Costs associated with the expenses related to the process of forming the property to be built or replaced.

M: Costs associated with the operations necessary for the marketing and sale of the asset.

By substituting C_{inv} in *VBC*, we obtain:

$$VBC - [T + D_{proj} + C + K] - [M + L] = 0. \tag{2}$$

3.1 Land Cost

The cost of a developed piece of land, denoted as *T*, is determined by adding the cost of the undeveloped land to the expenses for infrastructure works, consultant fees, designer fees, and construction manager fees.

To determine the relative value of the land, denoted as v_T, we divide the land cost by *VBC* using the following equation:

$$v_T = \frac{T}{VBC}. \tag{3}$$

3.2 Construction Cost

Accurate estimation of construction costs is crucial for development investment analysis. It encompasses the costs directly associated with the construction process and related expenses. In the case of buildings, the following subsections discuss both aspects. Considering the wide range of building construction systems, even within the same usage category, cost estimates are rough approximations that can only be obtained under specific and well-defined conditions.

The accuracy of cost estimation depends on the level of project detail. Therefore, cost estimation methodologies are often tailored to different project stages, from the *preliminary Study* – the initial phase where the project begins to take shape to the *execution Project* – a coordinated set of written information and drawings that can be easily interpreted by entities involved in project execution, thus the precision of cost estimation improves, ranging from a simple estimate to a budget value. Different types of cost estimates are grouped by how well-defined the project is. Other factors, like the goal of the estimate, the method used, and the resources (time and money) needed are not as important[2].

[2] Several organisations offer groups or levels for estimating how much building will cost. As an example, the AACE International (2019), the American Society of Professional Estimators (2004), and the AACE International (2019) all talk about five levels of cost estimation. The Association canadienne de la construction (2012) suggests four levels

3.3 Indirect Costs

Indirect costs, also known as "administrative overhead", include expenses related to the licensing and management of construction works, as well as the procedural and administrative aspects of the construction process. These costs do not include land acquisition expenses or costs associated with asset marketing and sales. Indirect costs typically range from 5 % to 10 % of the construction cost (indicative values) (Miranda and Camposinhos, 2021).

Other indirect costs involve management and supervision activities, such as construction execution supervision, quality control, environmental monitoring, construction safety, and planning. These costs can range from 2 % to 3 % of the Construction Cost, C (Designing Buildings Wiki, 2022; Miranda and Camposinhos, 2021).

It is also important to consider the costs associated with licenses and fees, L_{tax}, which are related to project approvals, municipal licensing of the construction works, as well as property registration and land registry costs. In general, the most significant expenses are related to construction and occupancy licenses and fees for licensing urban infrastructure works. Each municipality periodically sets a table with the values of the applicable fees. The available information allows estimating a value as a percentage of the construction cost, C, ranging from 3 % to 7 % (Miranda and Camposinhos, 2021).

The relative value of indirect costs is typically expressed as a percentage of the construction cost:

$$\kappa_K = \frac{K}{C}. \tag{4}$$

3.4 Marketing and Sales

The costs associated with marketing and sales can be covered by the developer themselves or outsourced to an intermediary. Regardless of the chosen option, commission margins for intermediation should be included in the appraisal value. The developer is responsible for all direct marketing procedures, including advertising expenses, scheduling visits and negotiations, assistance in document preparation, post-sales support, etc. Agency fees generally range from 3 % to 6 % in European countries like Spain, France, Italy, or Portugal, which is higher than those in Anglo-Saxon countries.

based on the level of project detail or phase, with cost control during and after execution attending into a different level.

Costs related to certificates, licenses, property, and land registration should also be considered in this section and typically represent around 1.

The percentage values mentioned in this section are based on the final value, *VBC*.

Therefore, the value of λ_M represents the percentage of the costs associated with marketing and sales, *M*, based on the cost property value, *VBC*:

$$\lambda_M = \frac{M}{VBC}. \tag{5}$$

3.5 Profit Margin

A gross profit margin, *L*, of the investment is assumed and expressed in relative terms of the property value through the margin rate, μ_L:

$$\mu_L = \frac{L}{VBC}. \tag{6}$$

Although it is difficult to determine the specific profit margins of builders and developers, historical data on profit margins in the United States and Canada are available. Average values of pre-tax operating profit margins in the real estate sector in the United States, based on studies by Yardeni (2018), may vary from 11 % for industrial facilities to 30 % for retail and apartments.

3.6 Explicit Formulation

Appraisals often rely on the construction cost, *C*, as it is a quantifiable and influential component. Therefore, the following expression is used to calculate the value-based cost, *VBC*, based on the relative parameters mentioned above:

$$VBC = \frac{C \cdot (1 + \kappa_K)}{1 - (\nu_T + \lambda_M + \mu_L)}. \tag{7}$$

To use this expression, the relative values of the investment cost, κ_K, ν_T, λ_M, μ_L, and the construction cost *C* must be known. If the value of the land cost, *T*, is also known, Equation 7 can be written as:

$$VBC = \frac{T + C \cdot (1 + \kappa_K)}{1 - (\lambda_M + \mu_L)}. \tag{8}$$

We define τ_C as the relative value of the construction cost, C, to the cost-based value, VBC:

$$\tau_C = \frac{C}{VBC}. \tag{9}$$

By substituting its value in Equation (8), we can use the following formula to estimate the cost-based value when only the land cost is known:

$$VBC = \frac{T}{1-(\lambda_M + \mu_L) - \tau_C \cdot (1+\kappa_K)}. \tag{10}$$

4. Income Approach

The Income Approach is a method used to determine the present value of a property by updating or discounting its projected future net incomes.

For leasable properties, the income approach can convert the generated incomes into an equivalent capital known as the income-based value (*VBR*).

To determine the income-based value, one must know the net operating income at the valuation date, project it over a specific time horizon, and apply a discount rate that accounts for market conditions and income risk.

The value based on income is the sum of the present value of the net incomes plus the potential residual value of the appraised property, usually updated at the same rate, for the considered time horizon[3].

Net operating income is calculated by subtracting operating expenses, and occasionally capital expenses, from the effective gross income. This calculation may also consider costs related to replacement, maintenance, and improvement investments. In this regard, according to the European Valuation Standards 2016, when the income approach is used to calculate the Market Value, deductions are made for the Municipal Property Transfer Tax (*IMT*), Stamp Duty (*IS*), income taxes (*IRS* or *IRC*), and other transaction expenses from the calculated income value.

[3] It should be noted that the benefits being appraised are future-oriented. Therefore, any method included in the Income Approach cannot solely rely on past revenues or expenses. While both are important, they cannot be the only sources of information. The appraiser must exercise special care and be aware that the values are not a reflection of the past or even the present. They are an anticipation of the future (TEGoVA, 2020).

4.1 Estimating the Income-based Value

To determine the value based on income, lease rents are often equated to a series of constant and perpetual monthly incomes. The current expression for this value, denoted as *VBR*, can be simplified as follows:

$$VBR = \frac{12 \cdot R_M}{t_a} = \frac{R_a}{t_a} \tag{11}$$

where:

R_M: Gross monthly rental value;

R_a: Gross annual income;

t_a: Conversion factor; discount rate, or simply yield[4].

This formulation implicitly assumes:

- The residual value of the building is zero, or the discounting period is sufficiently high[5].
- The rents are monthly.
- The conversion factor t_a represents a certain annual rate that includes the risk premium plus the risk-free interest rate value.

This approach results from comparing, based on market rental indicators, the value of the gross annual income R_a and the valuation value *VBR*. This comparison is made using the defined relationship in Equation (11), which can express a certain discount rate.

4.1.1 Discounted Sum of Incomes

The value of a property, *VBR*, is determined by the net present value of the cash flow it generates. To obtain a more accurate estimation, the net operating income (revenues minus costs) is discounted at a specific rate, *t*. It is important to note that the reliability of this valuation is limited due to changing conditions over time, making it difficult to predict future fluctuations and changes that may impact the value.

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[4] The yield rate is a comparison between the gross annual rent of a real estate asset and its purchase price or market value. It is an indicator of profitability for the housing market, similar to the stock market. The price of a property should reflect the future benefits (dividends) of owning it, both from an investor's profitability and a homeowner's rental savings perspective.

[5] Residual value refers to the estimated value of the property at the end of the analysis period.

The gross income of a property is derived from the rental value and the conditions of the lease contract. The rental value is influenced by supply and demand dynamics, reflecting the rental market conditions throughout the property's lifespan. Additionally, the rental value estimation should consider factors such as the building's condition, location, functional capacity, and state of conservation.

Let's define the following variables:

R: the value of each constant and post-dated receipt over a given period of time;

t: discount rate;

n: the number of corresponding periods, equal to the discounting period;

T: Land value or residual value.

The general expression for calculating the sum of values in a series of receipts, denoted as V, is as follows:

$$V = R \cdot \frac{1-(1+t)^{-n}}{t} + T \cdot (1+t)^{-n}. \tag{12}$$

This expression represents the sum of values of a series of regular receipts, each corresponding to the same period. Notice that Equation (11) results from taking the limit as $n \to \infty$ in Equation (12):

$$V = R \cdot \lim_{n \to \infty} \left[\frac{1-(1+t)^{-n}}{t} + T \cdot (1+t)^{-n} \right] = \frac{R}{t}. \tag{13}$$

It's important to note that this deduction holds true irrespective of the values of T and $t > 0$. In practice, given the prevailing interest rates (t) and the typical lifespan of buildings (spanning several decades), the difference between the two expressions is usually negligible.

Periods and Discount Rates

To ensure consistency in calculating the *VBR*, we need to convert the monthly rental income into an annual value. This is because the discount rate is typically annual, and we need to treat monthly rents as if they were annual.

To do this, we can replace Equation (11) with the correct expression for *VBR*:

$$VBR = \frac{12 \cdot R_M \cdot \left(\left(1 + \frac{t_a}{12} \right)^{12} - 1 \right)}{t_a^2} = \frac{R_a \cdot t_{ae}}{t_a^2}. \tag{14}$$

In scenarios with constant rents, the discount rate usually does not consider inflation. However, when inflation is taken into account in the calculation of *VBR*, the discount rate needs to be adjusted. It is important to note that the result will vary when rents and operating costs have different growth rates.

In situations where the market is unstable and inflation has a significant impact, the forecast of net operating income is made at current prices. In such cases, the discount rate should be adjusted based on the inflation rate. When evaluating real estate returns in real terms, considering inflation, a combination of high economic growth and low inflation is typically more advantageous than scenarios with high (or low) growth and high inflation. Overall, profitability in the real estate sector is more sensitive to economic growth than to inflation.

4.1.2 Net Income

Net income, R_l, is equal to the actual gross income[6] minus operating expenses and sometimes capital expenses, replacement investments, maintenance, and rehabilitation costs.

Operating Expenses

Operating expenses, *OE*, which tenants are responsible for covering, include the following categories:

- Fixed expenses such as costs for cleaning, security personnel, property management, insurance, property tax (*MPT*), municipal fees, etc.;
- Variable expenses that depend on the level of utilization, such as costs for minor repairs, energy, maintenance and replacement works, etc.[7]

Quantifying projected operating expenses is usually very difficult, especially in market valuation. Under such circumstances, values resulting from the application of empirical coefficients can be used. For example, Nebreda et al. (2006) suggest that operating expenses can be approximately obtained by applying coefficients to the actual gross income as shown in Table 2.

[6] Potential gross income represents the total income generated by the property under full utilization. The actual gross income is obtained by deducting uncollectible revenues and losses due to occupancy rates below 100 %, and it can be considered as the investor's expectation of gross income (Miranda and Camposinhos, 2021).

[7] Although variable expenses, may not occur every year, they are in general considered evenly distributed over time for ease of analysis.

Table 2

Coefficients for Calculation of Operating Expenses

Property Type	Coefficient
Residential and office	20 %
Same with concierge services	30 %
Other purposes	10 %

Note: Table 2: Operating expense coefficients by property type *(percent of actual gross income).* Based on Nebreda, Padura, and Sánchez (2006).

The reader can find a detailed breakdown of operating expense values in the literature (Owusu-Opoku, 2015; Miranda and Camposinhos, 2021). However, the following paragraphs highlight the most important ones.

Taxes and fees are determined by the state according to social policies. The following are currently considered:

IR: Property Income

MPT: Municipal Property

Taxation on Rental Income

Taxation on rental income in the European Union can vary significantly from one country to another. Each country has its tax laws and rates that determine the applicable tax rate and tax deductions. Rental income is generally subject to progressive income tax rates, meaning that the tax rate increases as the income level rises. It is important to note that the taxable amount of rental income is obtained by deducting maintenance and conservation expenses from the gross income.

Municipal Taxes

In addition to income tax, many European countries and regions also impose municipal property taxes (MPT). However, the specific name, regulations, and rates of the property tax can vary between countries and even within different municipalities in the same country. This is because each country has its own tax system and local governance structure, which can influence how property taxes are implemented.

Additionally, some municipalities or utility companies may charge a Sewage Conservation Fee (SCF) for properties connected to the municipal sewer system. The purpose of the SCF is to fund wastewater treatment and conservation initiatives. To fully understand the details and obligations related to the Sewage

Conservation Fee in a specific jurisdiction, it is recommended to consult the regulations and guidelines provided by the local municipal or utility authorities[8].

Maintenance Costs

Maintenance costs refer to the expenses associated with maintaining the common areas of a property that are the responsibility of the landlord. Tenant-related costs, such as cleaning and security, are not included in this category.

The Building Maintenance Cost Information Service (BMCIS), provided by the Royal Institution of Chartered Surveyors (RICS), offers building maintenance cost indicators as a percentage of the construction cost, *C*, based on the age and type of building. These values range from 0.1 % to 1 %.

Maintenance costs vary depending on the age and type of the building. In the early years of a building's life, maintenance costs are higher as it is necessary to identify and correct any issues that arise after a few months of operation. These costs gradually decrease over the next 20 years. Subsequently, they increase continuously until the building reaches the end of its useful life, typically 50 – 60 years. For more information, refer to Table 3.

Table 3

Maintenance Costs

Building Type	Age (years)	T_M (% of C)
Single-family houses	≤ 3	0.50 %
	3 – 20	0.12 %
	≥ 20	1.00 %
Multi-family buildings with elevator	≤ 3	0.34 %
	3 – 20	0.09 %
	≥ 20	0.60 %
Buildings with elevator: housing; commercial; public buildings	≤ 2	0.60 %
	2 – 20	0.11 %
	≥ 20	0.52 %

Note: Table 3: Maintenance cost benchmarks by building type and age (percent of construction cost, T_M).
Source: BMCIS (RICS).

[8] The Sewage Conservation Fee (SCF) finances sewage conservation and treatment services and varies between municipalities, generally ranging from 30 % to 70 % of the water bill. Depending on the lease agreement, tenants may be responsible for paying the SCF in addition to water and sanitation expenses.

Fire Insurance

Fire insurance fees are also included in this section as they are generally mandatory. Insurance companies determine premium fees for fire insurance based on factors such as the area, age and type of construction, and proximity to higher-risk areas. As an indicative measure, the premium typically varies between 0.1 % and 0.5 % of the insured capital and does not include the value of the land (Miranda and Camposinhos, 2021).

4.1.3 Net Income Calculation

The net income, R_l, can be calculated by subtracting the operating expenses, OE, from the income, R_l. The operating expenses consist of fiscal costs, C_F, and maintenance costs, C_M:

$$R_l = R_i - OE \tag{15}$$

$$= R_i - (C_F + C_M) \tag{16}$$

The fiscal costs (C_F) are determined by subtracting maintenance costs, municipal tax (TIM) from gross income, and then applying taxes:

$$C_F = TIR \cdot (R_i - TIM \cdot VBR - C_M) + TIM \cdot VBR. \tag{17}$$

To calculate income tax, it is important to consider the taxable amount after deducting operational costs and other tax charges. Although the difference in current situations is relatively small, the tax rate should be adjusted accordingly. Therefore, we simplify the calculation of fiscal costs as follows:

$$CF = TIR \cdot R_i + TIM \cdot VBR. \tag{18}$$

where:

TIR: Annual rate applied to the gross income;

TIM: Annual rate that includes municipal taxes and is applied to the property value.

The operational costs are equal to:

$$OE = TIR \cdot R_i + TIM \cdot VBR + T_M \cdot C. \tag{19}$$

By substituting the value of OE from Expression 19 into Expression (15), we obtain the final net income value:

$$R_l = R_i - (TIR \cdot R_i + TIM \cdot VBR + T_M \cdot C). \tag{20}$$

5. Blended Approach

This section explores a blended approach that compares the perspectives of landlords and tenants from a value standpoint. The goal is to assess the relative advantages of buying or selling versus leasing.

A landlord, also known as the "lessor," is the property owner responsible for the property's upkeep and compliance with legal and contractual obligations related to the lease. On the other hand, a tenant is someone who occupies the property and typically pays periodic installments over a specified period.

In some cases, real estate investment companies or developers act as landlords by leasing properties they own or have developed. In such instances, the company or investor takes on the role of the landlord, managing the property, signing lease agreements, and ensuring compliance with legal and contractual obligations, just like any other landlord.

The following sections present a methodology that quantifies the Relative Leasing Advantage (*VRA*) from both the investor/landlord's and tenant's perspectives.

5.1 The Investor Perspective

To establish a feasible comparison, we replace *VBR* with *VBC* in Equation (20), as the property value based on cost needs to be similar to its value based on income, *VBR*. The equation becomes:

$$R_l = R_i - \left(TIR \cdot R_i + TIM \cdot VBC + T_M \cdot C\right). \tag{21}$$

By replacing R_a with R_i in Equation (14), the income-based value *VBR* is[9]:

$$VBR = \frac{\left[R_i - \left(TIR \cdot R_i + TIM \cdot VBC + T_M \cdot C\right)\right] \cdot t_{ae}}{t_a^2}. \tag{22}$$

Equation (22) captures the essence of the Blended Approach. The income-based value *VBR* is connected with the based on cost value *VBC*. This approach allows establishing the relationship between the income-based *VBR* and a transaction cost-based value *VBC*, noting that the developer's profit margin is implicit in the case of a sales transaction, while in the case of leasing, the profitability is implicit in the discount rate.

[9] Alternatively, using the relative construction cost τ_C according to Equation (9): $VBR = \frac{\left[R_i - \left(TIR \cdot R_i + VBC \cdot \left(TIM + \tau_C + T_M\right)\right)\right] \cdot t_{ae}}{t_a^2}$.

5.1.1 Relative Leasing Advantage

The relative leasing advantage, denoted as *VRA*, is defined as the ratio between the value based on income (*VBR*) and the value based on cost (*VBC*). It can be calculated using the following expression:

$$VRA = \frac{(R_i - OE) \cdot t_{ae}}{t_a^2 \cdot VBC}. \tag{23}$$

From the perspective of the landlord or investor, if $VRA > 1$, leasing is more advantageous than selling. Conversely, if $VRA < 1$, selling is more advantageous. Figure 1 illustrates the impact of the main parameters on the relative leasing advantage (*VRA*). The comparison is based on a practical case with the parameter values shown in Table 4.

Table 4

Values of the example illustrated in Figure 1

V_{BC} (EUR)	R_i (EUR)	t_a	*TIR*	*TIM*	T_M	τ_C
1,250,000	134,000	8.00 %	20 %	0.56 %	0.50 %	60 %

Note: Table 4: Baseline parameters for Figure 1 (VRA sensitivity analysis). Columns: *VBC* (cost-based value, €), R_i (gross annual rent, €), t_a (annual yield), *TIR* (income-tax rate on rent), *TIM* (property/municipal tax rate on value), T_M (maintenance cost rate on construction cost), τ_C (relative construction cost, *C/VBC*).

Minimum Leasing Rent vs. Selling

To determine the minimum rent value that developers should request when considering leasing as an option instead of selling, we can use Equation (24). By setting $VRA = 1$, we can calculate the gross rent minimum value, R_i, based on the market or cost sale value, *VBC*:

$$R_i = \frac{\left(t_{ae} \cdot (TIM + \tau_C + T_M) + t_a^2\right) \cdot VBC}{t_{ae} \cdot (1 - TIR)}. \tag{24}$$

The minimum rent value, R_i, obtained from Equation (24), represents the minimum rental income that developers should aim for when considering leasing as a viable option compared to selling.

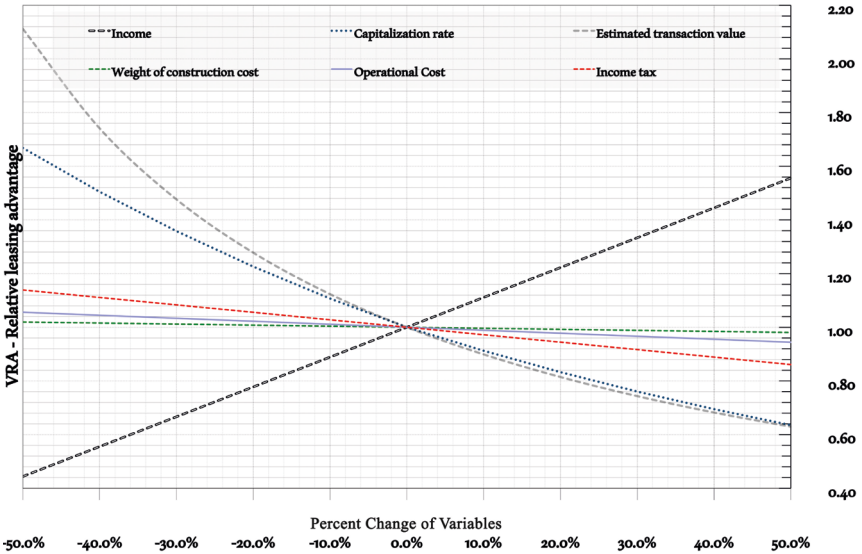

Figure 1: Variation of the relative leasing advantage for a practical case (cf. Table 4)

Minimum Transaction Value vs. Leasing

Similarly, by setting $VRA = 1$ in Equation (22), we can determine the minimum transaction value, VBC_{min}, based on a given rental value:

$$VBC_{min} = \frac{t_{ae} \cdot R_i (1 - TIR)}{t_{ae} \cdot (TIM + \tau_C \cdot T_M) + t_a^2}. \tag{25}$$

The minimum transaction value, VBC_{min}, calculated using Equation (25), represents the minimum sale value that makes selling more advantageous than leasing.

Minimum Profit Margin in Selling

The minimum selling profit margin value, μ_{Lmin}, is determined by equating the value based on cost, VBC (Equation (8)), to the value based on income, VBR (22). This can be expressed as:

$$\frac{T + C \cdot (1 + \kappa_K)}{1 - (\lambda_M + \mu_L)} - \frac{R_i - (TIR \cdot R_i + VBC \cdot (TIM + \tau_C + T_M))}{\chi} = 0. \tag{26}$$

To improve clarity, we will use χ to refer to the discount rate when considering the annual rent instead of the monthly rent[10]:

$$\chi = \frac{t_a^2}{t_{ae}} = \frac{t_a^2}{\left(1+\frac{t_a}{12}\right)^{12}-1}. \tag{27}$$

By expressing μ_L in Equation (26), we can obtain its minimum value:

$$\mu_{Lmin} = 1-\lambda_M - \frac{\left[T + C\cdot\left(1+\kappa_K\right)\right]\cdot\chi}{R_i - \left(TIR\cdot R_i + VBR\cdot\left(\tau_C\cdot T_M + TIM\right)\right)}. \tag{28}$$

Equation (28) allows us to determine the minimum percentage of profit, μ_{Lmin}, that a landlord/investor has when selling, considering the value based on income, i. e., when $VRA < 1$.

5.1.2 Illustration Examples

In the following paragraphs, we present practical examples to illustrate limits from the owners' or investors' perspectives regarding profit margins and return rates in renting.

Parameter Selection and Calibration

Examples are illustrative and not market calibrations. To localise the model, users should: i) source asking/contract rents for comparable units; ii) use observed yields for the relevant submarket; iii) retrieve local statutory tax rates for *TIR* and *TIM*; iv) estimate *TM* from age/typology-specific benchmarks. We now report all inputs alongside each example and include a short sensitivity check to show how conclusions vary with realistic ranges. This makes the calibration transparent and reproducible.

[10] The reader may check that for current discount rates the value of χ is approximately equal.

Minimum Profit Margin

In Figure 2[11], we illustrate, on the x-axis, the values of the minimum profit margin μ_L that a seller must achieve when comparing the annual gross rent R_i of 84,000 EUR and different discount rates ($2.5\% \lessapprox t_a \lessapprox 5.7\%$).

In this example, the relative marketing cost is $\lambda_M = 5\,\%$, the construction cost $C = 600{,}000$[12], the land cost is 216,000 EUR, and the indirect construction costs $\kappa_K = 13.0\,\%$ as defined in Equation (4). The operating costs and lease rates are: $TIM = 0.6\,\%$, $T_M = 0.5\,\%$, $TIR = 15\,\%$.

The reader can verify equality of property values using any ordered pair of values (μ_L, χ) from the graph, whether based on the cost approach (Equation (8) or the income approach (Equation (22)).

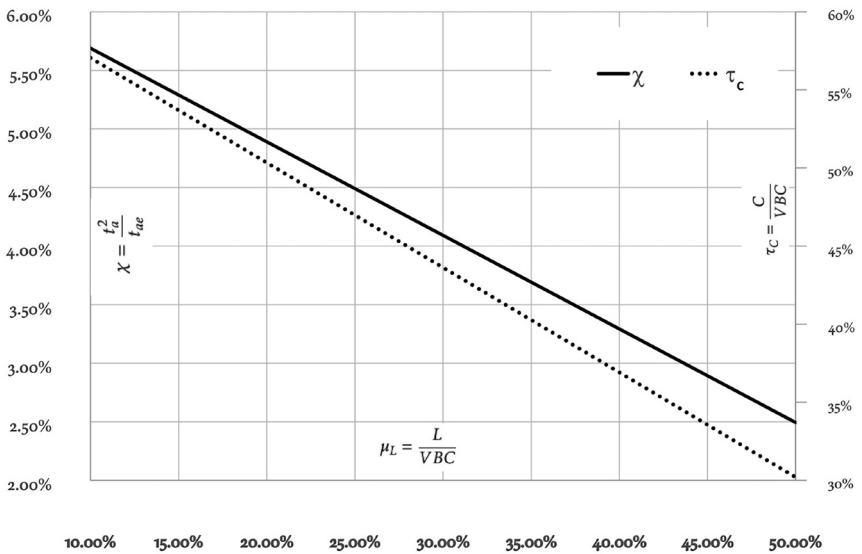

Figure 2: Minimum profit margin μ_L for VRA = 1

[11] On the y-axes, the left side represents the value of χ, while on the right side, one can see the relative cost of constructing $\tau_C = C/VBC$ as indicated.

[12] This cost represents $57\% \lessapprox \tau_C \lessapprox 30\%$, as depicted in the figure, for the different VBC involved.

Maximum Return Rate

To determine the discount rate χ at which the sale is carried out at the income-based value *VBR* without any relative disadvantage, we set Equation (28) to zero.

$$\chi \geq \frac{(TIR \cdot R_i + VBR \cdot (\tau_C \cdot T_M + TIM)) + (\mu_L - 1 + \lambda_M) - R_i}{T + C \cdot (1 + \kappa_K)}. \tag{29}$$

Figure 3 displays values of χ (left graph) and τ_C (right graph) for three different scenarios of construction costs, $C = 600$, 700, and 800 ($\times 10^3$ EUR). The three circled points on the *y*-axis indicate the values for $\mu_L = 0$.

For a detailed summary of these values, refer to Table 5 and the corresponding property valuation (*VBR* = *VBC*) as well. It should be noted that as χ decreases τ_C and valuation increases.

Table 5

Return rates, χ and relative construction costs, τ_C for 3 scenarios

Const. costs (10^3 EUR)	600	700	800
Valuation (EUR)	941,053	1,067,368	1,195,789
χ	6.49 %	5.63 %	5.06 %
τ_C	63.76 %	65.58 %	66.90 %

Note: Table 5: Break-even metrics for three construction-cost scenarios. Rows report the implied valuation (€, at *VBR* = *VBC*), the annual return rate χ, and the relative construction cost $\tau_C = C/VBC$ for construction costs of 600, 700, and 800 ($\times 10^3$ €).

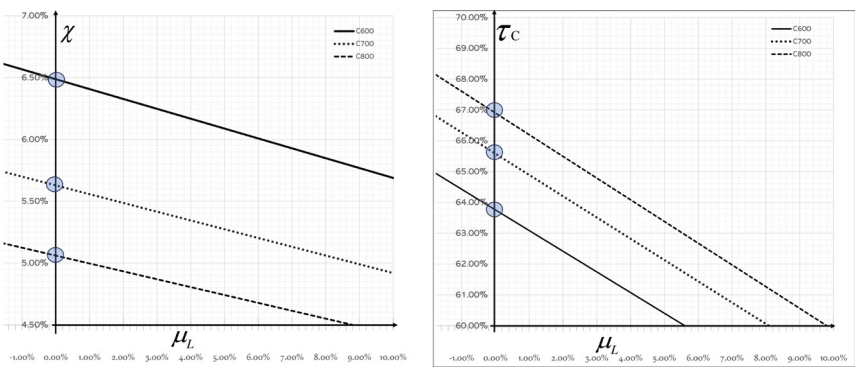

Figure 3: Limiting values for three cost construction cost scenarios

Example 1 – New Building

Consider a newly constructed building with 12 identical apartments, each with an area of 120 m^2. The investor is currently deciding whether it would be more advantageous to sell the apartments or rent them out instead. To account for this risk, the discount rate is assumed to be 3.0 % plus a risk premium of 6.0 %, based on comparable situations in some European countries.

Taking into account the construction costs and a post-tax profit margin of 20 %, the following cost-based transaction value is obtained and summarized in Table 6:

Table 6

Evaluation Values – Example 1

Construction Costs	τ_C	50 %	600,000
Land	T	18 %	216,00
Indirect Costs	K	12 %	144,00
Profit Margin	M	20 %	240,000
VBC (EUR)			1,200,000

Note: Table 6: Cost-based valuation inputs and result for Example 1 (new building). Components – construction cost *C*, land *T*, indirect costs *K*, and developer margin *M* – are shown as shares of V_{BC} and in euros; the implied V_{BC} appears in the last row.

The following costs and fees in leasing are taken from Table 7.

Table 7

Costs and fees in leasing – Example 1

t_a	*TIR*	*TIM*	T_M	τ_C
9.00 %	15 %	0.60 %	0.50 %	50 %

Note: Table 7: Lease-side parameters for Example 1 (annual rates unless noted). Columns: t_a (yield/discount), *TIR* (income-tax rate on R_i), *TIM* (property/municipal tax rate on value), T_M (maintenance rate applied to construction cost *C*), and $\tau_C = C/VBC$ (relative construction cost).

Substituting the above-mentioned values in Expression (24), the minimum value for the rent is obtained as follows:

$$R_i \geq \frac{\left(t_{ae} \cdot \left(TIM + \tau_C \cdot T_M\right) + t_a^2\right) \cdot VBC}{t_{ae} \cdot \left(1 - TIR\right)}$$

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and substituting the values from Table 7, we get:

$$R_i \geq \frac{0.09381 \cdot (0.006 + 0.5 \cdot 0.005) + 0.09^2 \cdot 1{,}200{,}000}{0.09381 \cdot (1 - 0.15)} \approx 133{,}902$$

If the rent is evenly distributed among the 12 units, the monthly rent per unit would be 930 EUR, compared to the selling price of each apartment, which is 100,000 EUR.

Example 2 – Used Building

Consider a building located in a highly sought-after area with a high demand for land usage. Although the building is in good condition, it is outdated. It consists of ten identical units that are currently being rented out for an average monthly rate of 400 EUR per unit. The investor believes that the uncertainties in rent collection are insignificant and assigns a risk premium of 2 % to the investment.

Additionally, they determine that a discount rate of 5 % is appropriate for this investment. Table 8 presents all the relevant data for this investment opportunity.

Table 8

Data for Example 2

t_a	t_{ae}	*TIR*	*TIM*	T_M	τ_C
5.00 %	5.116 %	20.0 %	0.20 %	0.60 %	40.0 %

Note: Table 8: Input parameters for Example 2 (annual rates unless noted). Columns: t_a (yield/discount), t_{ae} (effective annual factor), *TIR* (income-tax rate on R_i), *TIM* (property/municipal tax rate on value), T_M (maintenance rate on construction cost *C*), $\tau_C = C/VBC$ (relative construction cost).

The goal is to determine the potential sale value of a property. We can calculate the minimum transaction value based on the gross annual rent using Equation (25):

$$VBR = \frac{t_{ae} \cdot R_i (1 - TIR)}{t_{ae} \cdot (TIM + \tau_C \cdot T_M) + t_a^2} =$$

$$= \frac{5.116\% \cdot 48{,}000 \cdot (1 - 20.0\%)}{5.116\% \cdot (0.20\% + 40.0\% \cdot 0.60\%) + 5.0^2} = 720{,}931$$

This means that the average value assigned to each unit is approximately 720,931/10 ≈ 72,100 EUR.

5.2 Buyer or Tenant Perspective

When deciding whether to rent or buy a property, there are several factors to consider. These factors include financial stability, market conditions, flexibility, residential stability, costs, and personal financial goals. Buying a house or any other property requires a significant upfront investment but offers customization and the opportunity to build equity. On the other hand, renting offers mobility but comes with additional costs and responsibilities.

To evaluate the advantages of leasing versus buying, a thorough analysis is necessary. This analysis should consider financing costs and the impact of inflation.

The process involves calculating the present value (*PV*) of cash flows for both leasing and buying scenarios. This allows us to determine the financial feasibility of each option. By examining these cash flow projections, we can gain valuable insights into how leasing compares to acquisition over time, considering both immediate and long-term financial implications.

From the tenant's perspective, the decision should be based on choosing the scenario with the lowest *PV*, as this offers the most financial benefit over time.

5.2.1 Present Value of Rents

Calculating the present value of rents, VAR_k when the value of the rent in the first period, R_1 is known as well as its real growth rate, at the end of a certain period denoted as k is done with the following formula:

$$VAR_k = \sum_{j=1}^{k} R_i \cdot (1 + t_{ra})^j \cdot (1 + t_a)^{-j}. \tag{30}$$

Here, t_{ra} stands for the real discount rate, which is calculated as:

$$t_{ra} = \frac{(1 + t_a)}{(1 + i)} - 1; \tag{31}$$

where t_a is the current price discount rate and i is the inflation rate.

5.2.2 Valuation of Cash Flows Incorporating Loan Structure

In the realm of purchase financing, it is widely acknowledged that the predominant form of credit is commonly a mortgage, especially when it comes to owner-occupied property. The loan's main security is derived from the property's worth, whilst the costs related to financing include the capital expenditure and different fees, such as borrower and property insurance premiums, mortgage registration fees, and similar charges. The costs under consideration can be represented as an annual loan cost rate, denoted as t_{aeg}. In Europe, the commonly employed method for loan repayment is the French system, which features the utilization of constant-value post-dated installments.

To determine the current value of financial inflows linked to a loan, it is important to evaluate the present worth of anticipated cash flows, including loan repayments. The procedure entails the application of a genuine discount rate to the forthcoming cash flows with the aim of ascertaining their current worth. The equation used to compute the value of the installment payment, represented as P, is derived from the given borrowed capital, D, effective annual interest rate, t_{aeg}, and amortization period, n.

$$P = \frac{D \cdot t_{aeg}}{1 - \left(1 + t_{aeg}\right)^{-n}}. \tag{32}$$

The constant installment value can be expressed as the sum of the amortization value, denoted as A, and the interest value, denoted as J. Hence, the computation of the outstanding loan balance at the end of each period k is accomplished by the utilization of the subsequent formula:

$$\begin{aligned} D_k &= D_{k-1} - A_k \\ D_k &= D_{k-1} - \left(P - J_k\right) \\ D_k &= D_{k-1} - \left(P - t_{aeg} \cdot D_{k-1}\right) \end{aligned} \tag{33}$$

To clarify, the loan balance remaining at time k can be calculated using the subsequent equation:

$$D_k = D - A_1 \cdot \left(\frac{\left(1 + t_{aeg}\right)^k - 1}{t_{aeg}} \right). \tag{34}$$

where A_1 is the amortization value in the first period.

The present value of financial flows, including financing, $PV_{(EK)}$ at the end of a given period k, corresponds to the present value of instalments, minus the difference between the estimated transaction value of the property PVT at the end of period k at current values, and the outstanding loan balance D_k at that date:

$$PV_{(Ek)} = P \cdot \frac{1-(1+t_a)^k}{t_a} - \frac{PVT_k - D_k}{(1+t_a)^k}. \tag{35}$$

where t_a is the current price discount rate.

In order to determine the worth of the property at the end of period k, denoted as PVT_k, we take into account the combined effects of appreciation and inflation that have occurred over the course of k periods on the initial purchase value PVT_1.

$$PVT_k = PVT_1 \cdot \left(\frac{1+p}{1+i}\right)^k. \tag{36}$$

where p is the appreciation rate and i is the inflation rate.

Equation (35) illustrates a transaction in which the entire purchase is funded without any contribution from the purchaser's own capital, hence yielding a financing percentage of 100 %.

In the majority of instances, the financing entity commonly requires investor participation by means of personal capital, which is represented as the difference between the value of the purchase price PVT_1 and the borrowed capital D. The determination of the financial percentage is the ratio between the amount of debt D and the initial present value of the project PVT_1.

In the provided context, the cash flow is modified to incorporate the value of proprietary capital, represented as (PVT_1 – D). Consequently, Equation (35) undergoes the necessary modification:

$$PV_{(Ek)} = P \cdot \frac{1-(1+t_a)^{-k}}{t_a} + (PVT_1 - D) - \frac{PVT_k - D_k}{(1+t_a)^k}. \tag{37}$$

where p represents the appreciation rate and i the inflation rate.

The relative advantage of renting at the end of a certain period, VRA_{Ek}, can be calculated by dividing the present value of cash flow with a loan (Equation (37) by the present value of rentals (Equation (30)):

$$VRA_{Ek} = \frac{VR_{(Ek)}}{VR_{(Rk)}} = \frac{P \cdot \dfrac{1-(1+t_a)^{-k}}{t_a} + (PVT_1 - D) - \dfrac{PVT_k - D_k}{(1+t_a)^k}}{\sum_{j=1}^{k} R_i \cdot (1+t_{ra})^j \cdot (1+t_a)^{-j}} = . \quad (38)$$

If VRA_{Ek} is more than 1, then from the standpoint of the buyer or tenant, renting is preferable. On the other hand, it makes more sense to use a possible loan to buy the house if VRA_{Ek} is less than 1. The resident in this case stands to benefit more the lower the cash flow's present value. Remember that VRA_{Ek} might change signs with time, meaning that the occupancy time prediction affects the relative advantage[13].

5.2.3 Illustration Example

In this section, we will discuss on choosing between renting and buying by analyzing various scenarios, financial considerations, and some real-world factors by means of practical situation.

Lease or Loan Purchase

In this study, we examine the potential benefit of utilising a mortgage loan to purchase an apartment with a monthly rent of 400.00 EUR, subject to a yearly increase of 2.0 %. Interest charges, insurance premiums, and commissions are included in the loan's 40-year term, for a total annual effective interest rate of 5.6 %. It is worth noting that the annual gross rent to sale value yield ratio stands at 3.84 %.

The estimated appreciation rate for the property, taking into account its location, is 3.0 %. Additionally, for the forty-year period under study, the inflation rate is projected to be around 2.0 % annually. The financial flows corresponding to each scenario are discounted at an annual rate of 5 % (t_a).

[13] Please note that the interpretation of relative leasing advantage value is inverse to the owners' perspective, as indicated in Section 5.1.1.

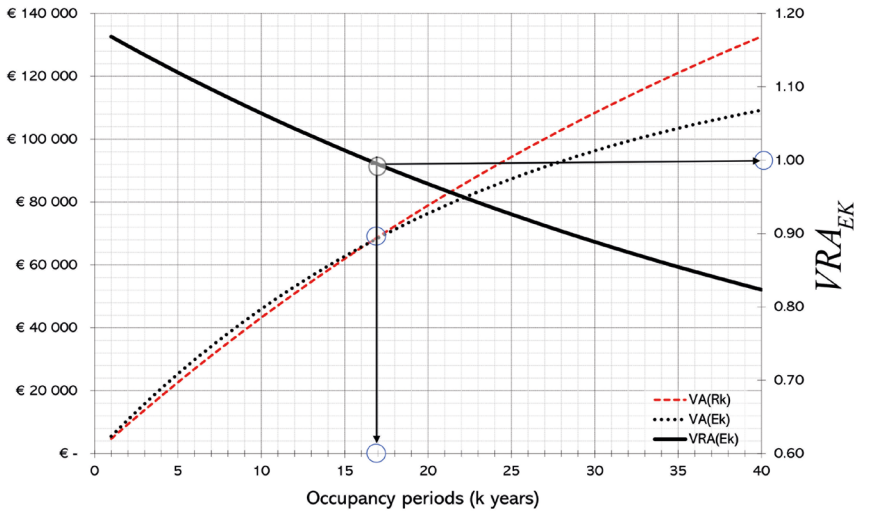

Figure 4: Relative advantage of leasing versus purchase with loan VRA_{Ek}

Loan 100 %

Taking into account that the loan amount is equal to the apartment's 125,000.00 EUR market value, Figure 4 presents the study's conclusions.

The comparative advantage of leasing over loan financing for purchases is shown in the figure as VRA_{Ek} (y-axis on the right).

The data that is presented indicates that financing a purchase only starts to pay off 17 (seventeen) years after the purchase date. When the duration of occupancy is brief, leasing is the better choice. The junction of the discounted values (y-axis on the left) of the cash flows related to renting and buying with a loan determines this length. It is represented by the VRA_{Ek} unit value, which is the relative benefit of leasing as opposed to buying and borrowing.

Let us now imagine that the rent for the same flat is raised to 625.00 EUR/month, meaning that there would be a 6.00 % annual yield.

The case of rent rise is depicted in Figure 5. Regardless of the length of the tenancy, it is clear that buying the flat is always beneficial for the occupant because the VRA_{Ek} value is never more than 1.

If a short to medium period occupancy (let's say k = 10 years) is being considered, comparing the two rent prices indicated above and applying Expression (38) leads to the following results for VRA_{Ek}:

– For a monthly rent of 400.00 EUR → VRA_{E10} = 1.064

– For a monthly rent is 625.00 EUR → $VRA_{E10} = 0.681$

The reader can attest that it would only make sense to buy for a 10-year occupancy period if the rent value were less than 425.54 EUR.

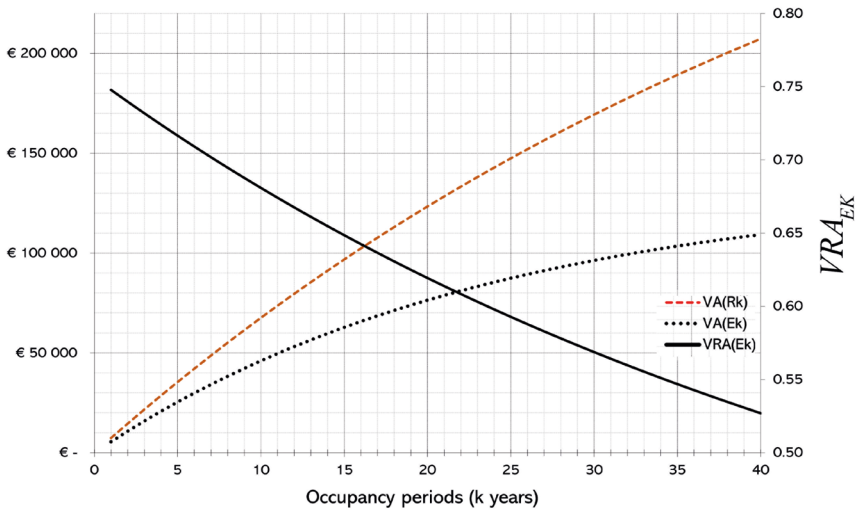

Figure 5: Relative advantage of leasing versus purchase with loan – $VRA_{Ek} < 1$ – yield equal to 6 %

80 % Loan

The loan amount is 80 % of the apartment's 125,000.00 EUR market value.

Maintaining the aforementioned assumptions, the objective is to determine the maximum time of occupancy in which the advantages of purchasing with a loan surpass those of leasing, while altering solely the financing %. Specifically, the rent amount is 400.00 EUR and the financing amount is 100,000 EUR.

By substituting the given data into Equation (38) and solving for k iteratively until the equation equals 1, the calculated value for k is determined to be 14 years. Currently, the remaining amount due is 85,412.00 EUR and:

$$VRA_E\,14 = \frac{58{,}279.39}{58{,}348.94} \approx 1$$

Figure 6 illustrates the varying values of VRA_{Ek} within the range of $1 < k \leq 40$. The focus is on the 14-year duration of occupation, which aligns with the assigned unit value for Relative Advantage of Leasing.

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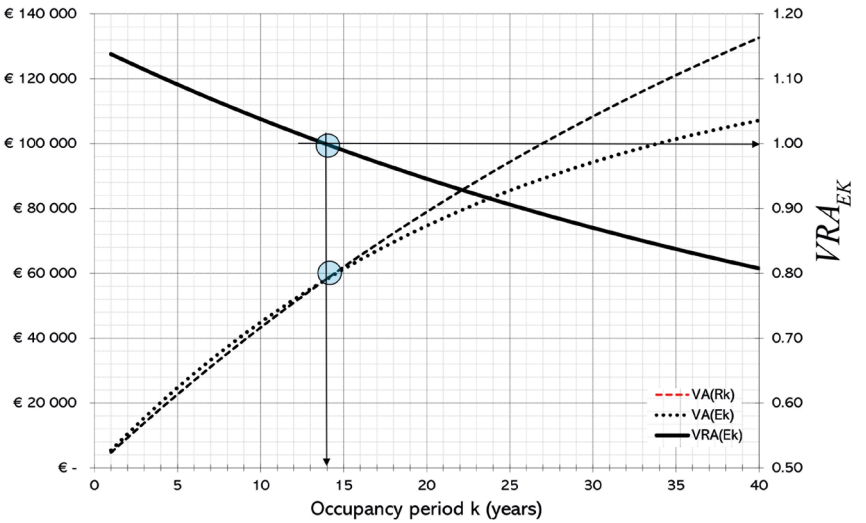

Figure 6: Relative advantage of leasing comparing to purchasing with 80 % financing

5.2.4 Additional Considerations

It should be mentioned that the way the formulation is presented – from the viewpoint of the tenant or buyer – allows for the introduction of additional factors, including inflation, financing rates, and appreciation or depreciation due to physical wear or even obsolescence, which can result in the formation of various scenarios.

The variables described above have the ability to significantly influence the decision-making process. Nevertheless, as exemplified in the aforementioned examples, the decision-maker must prioritise the elements that they consider to be the most relevant[14].

6. Conclusions

The decision-making process of investors, developers, property owners, occupants, tenants, or mortgage debtors in relation to leasing, selling, or buying is contingent upon a multitude of circumstances and is influenced by the unique viewpoint of each person involved in the transaction, whether it be a sale or lease.

[14] For example, opting for a loan that is linked to the EURIBOR interest rate or a fixed rate during periods of inflationary volatility could substantially increase the monthly loan repayment amount in the first periods.

The article introduces an analytical framework that enables the evaluation of the comparative benefits associated with the options of acquiring with or without financing for occupants, and selling for investors or owners.

This study presents and elaborates on the theoretical construct of Relative Leasing Advantage (*VRA*), which encompasses multiple variables that are relevant to the phenomenon. When considering investment opportunities, investors typically evaluate the relationship between profit margins, building expenses, and the potential profitability of leasing. When considering the tenant who is also a mortgaged buyer, several significant elements come into play. These criteria encompass the amount of debt, the rate of inflation, the appreciation of the property, the anticipated duration of occupation, and other relevant considerations.

The contrasting perspectives of the parties are apparent, as the investor will choose to lease if the final property worth surpasses that of a transaction that incorporates a profit margin. Conversely, the decision made by the occupant will be based on selecting the alternative that yields the lowest value of discounted cash flows, whether it be leasing or acquisition. It is important to note that this outcome is heavily influenced by the duration of occupancy.

The article contains formulations that serve as decision support, considering the aforementioned principles, perspectives, and market conditions. The aforementioned instances demonstrate that the leasing yield rate holds considerable significance for investors. The advantage of leasing versus buying might be influenced by several factors for homeowners. Nevertheless, the formulation permits the inclusion of all variables, hence enabling the development of probable situations.

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